been established is the use of the antennæ. Some entomologists have regarded them as olfactory organs, some as ears; the weight of authority being perhaps in favour of the latter opinion. In experimenting on his wasps and bees Sir John, to his surprise, could obtain no evidence that they heard at all. He tried them with a shrill pipe, with a whistle, with the violin, with all the sounds of which his voice was capable, doing so, moreover, within a few inches of their head, but they continued to feed without the slightest appearance of consciousness.

Lastly he recounted some observations to show that bees have the power of distinguishing colours. The relations of insects to flowers imply that the former can distinguish colour, but there had been as yet but few direct observations on the point.

THE CAVENDISH LABORATORY

THIS Laboratory, in which every facility is furnished for the prosecution of physical research, is the munificent gift of William Cavendish, Duke of Devonshire, K.G., Chancellor of the University, who has intimated his intention of presenting it complete to the University.

The building, which is now finished, was erected from the designs of W. M. Fawcett, M.A., of Jesus College, at an expense of about 10,000*l*.

The ground-floor contains a set of rooms for operations requiring great steadiness, such as the measurements of length, time, and mass, and of heat, electricity, and magnetism. A store-room, a workshop, and a battery-room are also provided on the ground-floor.

The first floor contains a spacious lecture-room with a preparation-room, a large apparatus-room, a private room for the professor, and a large working laboratory, fitted with tables standing on beams of their own, so as to be independent of the vibrations of the floor. All the tables in the building are supported in the same way, and there are in every floor small trap-doors, by means of which bodies may be suspended over the tables in the room beneath, and through which electric and other communications may be made.

The upper rooms are intended for acoustics, radiant heat, optics, electricity, and the graphic reduction of observations. There is also a dark room for photographic preparations. The air in the electric room will be kept dry by a contrivance due to Mr. Latimer Clark, and the electric machine worked in this room may be made to furnish electricity for experiments in the lecture-room.

In the tower will be erected an iron tube, which may be filled with mercury so as to measure the greater pressures to which gases and vapours are subjected in the heat-room on the ground-floor. There is also an arrangement by which the electric potential of the air at the top of the tower may be measured either in the lecture-room or in the electric-room.

The laboratory is open daily from 10 A.M. till 6 P.M. under the superintendence of the Professor of Experimental Physics, for the use of any member of the University who may desire to acquire a knowledge of experimental methods, or to take part in physical researches.

NOTES

A REUTER'S telegram from Aden, of March 23, states that the steamer *Calcutta* arrived there from Zanzibar on the previous day with the body of the late Dr. Livingstone. We fear this must be regarded as final, and as shutting out any further hope; we can only now do all possible honour to those remains which the doctor's faithful servants have so religiously preserved. A letter recently received from Zanzibar, by Mr. R. A. Laing, states that the body, after having been exposed to the sun for a month to dry, and then packed in a hollowed tree, was wrapped round with cloth, and the natives carrying it supposed it a bale of cloth, or kaniki.

H.M.S. *Challenger* arrived at Melbourne on the 17th inst.: all well. On her voyage from the Cape of Good Hope, she reached the Antarctic Circle between E. long. 70° and 80°.

IN connection with our leading article this week we see with pleasure that Mr. Mundella gave notice in the House of Commons on Monday, that "at an early day he would call attention to the Report of the Science Commissioners on National Museums, and move that, in the opinion of the House, steps should be taken to render National Museums and Galleries of Art more available for instruction for the purposes of Science and Art." We sincerely hope Mr. Mundella's motion will lead to some decided step in advance.

WE are sorry to have to announce the death of Johann Heinrich Maedler, the distinguished German astronomer, at Hanover, on March 14, at the advanced age of eighty. One of his best-known works is a Map of the Moon, of which he was the joint author with M. Beer. He was appointed Professor of Astronomy and Director of the Observatory at Dorpat in Russia about 1840, and was also the writer of various astronomical treatises:—"Popular Astronomy," Berlin, 1849; "The Existence of a Central Sun," Dorpat, 1846; "Lectures on Astronomy," Mittau, 1845–47, &c.

WE are informed that the Royal Belgian Academy has resolved to place the bust of Quetelet in the hall where its meetings are held. We believe no successor to the Directorship of the Brussels Observatory has yet been named.

AT the last meeting of the Royal Irish Academy, the Rev. Prof. Jellett resigned the office of president, and Wm. Stokes, M.D., D.C.L., F.R.S., was elected in his stead. Dr. Sullivan also resigned the secretaryship of the Academy on being made president of the Queen's College, in Cork, and Dr. E. Perceval Wright, F.L.S., was elected to the post. Dr. R. McDonnell, F.R.S., was also elected to the secretaryship of Foreign Correspondence in the place of Sir W. Wilde.

THE Professorship of Astronomy in the University of Dublin, the holder of which is also Astronomer Royal of Ireland, is now vacant by the resignation of Dr. Francis Brünnow. Since its foundation this professorship has been held by Dr. Henry Ussher (1783), Dr. John Brinkley (1790), Sir William Hamilton (1827), and Dr. Brünnow (1865). The election will be held on April 18. Rumour in Trinity College points to Prof. R. Ball, LL.D., F.R.S., as the most likely successor to Brünnow, a distinguished graduate of the University of Dublin in both pure mathematics and experimental physics. Dr. Ball acquired an extensive knowledge of astronomy during the several years that he acted as the late Lord Rosse's assistant at the Observatory at Parsonstown.

AT a numerously attended meeting of the Fellows of the Royal College of Surgeons, Ireland, held in the College Hall, Dublin, on the 13th inst., it was resolved, by a large majority, that it is not expedient for this college to take part in the proposed conjoint scheme for the examination of medical graduates in Ireland. The conjoint scheme had already been approved of by the Council of the College, by the Medical Professors and Board of Trinity College, Dublin, by the King and Queen's College of Physicians, Ireland, and by the Governors of the Apothecaries Hall.

THE circular of the Board of Trade, respecting Storm Warnings, which appeared in our last, appears to require a few additional remarks by way of explanation. The circular

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speaks of an explanatory pamphlet which is now before us, and we see from it that the intention of the present system of signals is to give an indication of the *direction* of the wind to be apprehended in every case. The drum is never to be used without the cone. Its signification in Admiral FitzRoy's time was "dangerous winds from nearly opposite quarters successively;" and it accordingly gave no indication of direction *by itself*. Experience has shown that there is a much greater degree of certainty in foreseeing the *direction* than the *force* of a coming strong wind. Furthermore an attempt is made to give a degree of numerical definitiveness to the warnings, which at once admits that they are not infallible. The Committee say:—"Hitherto it has been found that at least three out of five signals of approaching storms (force upwards of 8 Beaufort scale, a 'fresh gale,') and four out of five signals of approaching strong winds (force upwards of 6 Beaufort scale, a 'strong breeze') have been fully justified." We may fairly consider this as a step in the direction of treating weather indications by the laws of exact science.

WE are glad to learn that Prof. Alluard, of Clermont-Ferraud, has at last succeeded in surmounting the various obstacles which he met with in the establishment of his proposed observatory on the Puy de Dome, at an elevation of about 1,660 metres above the surrounding country (NATURE, vol. vii. p. 481). The chief difficulty arose from the opposition of the peasant proprietors to the invasion of their rights by the construction of a road and erection of the building. M. Alluard announces that the observatory will be ready to be inaugurated in September next, and has invited his meteorological friends to visit Auvergne on that occasion.

A LARGE deposit of Moa bones has lately been discovered in a swamp at Hamilton, in Otago. Besides *Dinornis*, the swamp contains bones of *Aptornis*, *Harpagornis*, &c. The whole have been secured by the curator of the Otago Museum.

The Sedgwick Geological Prize (Cambridge) has been adjudged to J. J. Harris Teale, B.A., St. John's College. The subject for the next prize will be—"The post tertiary deposits of Cambridgeshire and their relation to deposits of the same period in the rest of East Anglia."

THE French Society of Geography has decided upon holding an International Geographical Congress at Paris in 1878. Rules and programmes will be issued shortly.

THERE has recently been concluded in connection with the Liverpool Free Public Library and Museum, a carefully arranged and excellent course of Free Lectures. This is the ninth winter course in connection with the same institution, from which we are glad to infer that these free lectures have been a success. We should like to see similar courses inaugurated in all our large towns; we believe the results would be in the highest degree beneficial. The following is a summary of the Liverpool course:—Eight Lectures on Art, by Mr. W. J. Bishop; Three Lectures on Natural History, by Mr. T. J. Moore; Six Lectures on the Chemistry of Salt, and of the Manufactures depending on it, illustrated with Specimens, Experiments, Diagrams, &c., by Mr. Edward Davies, F.C.S., &c.; Three Lectures on Geology, by Mr. G. H. Morton, F.G.S., F.R.G.S.I.; Two Lectures on Mineralogy and Mining, by Mr. F. P. Marrat, M.L.G.S.; Six Lectures on Navigation and Astronomy, by Mr. J. T. Towson, F.R.G.S.; Two Lectures on Art and Antiquities, and one on Town Window Gardens, by Mr. Charles T. Gatty; Three Lectures on the Constitutional History of England, illustrated with Historical Maps, by Mr. James Birchall; Four Readings, by Mrs. H. J. Gorst.

THE Austrian amateur navigator, Count Wilczek, writing in the *Neue Freie Presse*, says that there is no ground for apprehension as to the fate of the Austrian Polar Expedition which sailed in the *Tegetthoff*, in the year 1872, and that news will probably be received from the expedition in October or November next. Letters for members of the expedition will be despatched by the Austro-Hungarian Government by means of whaling and other vessels bound for the Arctic seas.

MESSRS. TRÜBNER and Co. have in the press and will shortly publish a treatise on "Valleys, and their Relation to Fissures, Fractures, and Faults," by G. H. Kinahan, M.R.I.A., F.R.G.S.I. This work will be dedicated by permission to His Grace the Duke of Argyll.

MR. F. C. S. ROPER, F.L.S., has published a "Supplement to the Fauna and Flora of Eastbourne, together with a list of Eastbourne Cretaceous Fossils."

MESSRS. S. W. SILVER & Co. have just published a "Handbook for Australia and New Zealand," containing a large amount of varied and useful information about the various colonies in that quarter of the world. It is accompanied by a "Seasons'-Chart of the World."

THE additions to the Zoological Society's Gardens during the last week include two Palm Squirrels (*Sciurus palmarum*) from Ceylon, presented by Capt. Forster; a Sonnerat's Jungle Fowl (*Gallus sonnerati*) from South India, presented by Mrs. White; two Tench (*Tinca vulgaris*) British, presented by Mr. W. Arnold; a Black-eared Marmoset (*Hapale penicillata*) from Brazil, presented by Mr. F. Graham; a Leadbeater's Cockatoo (*Cacatua leadbeateri*) from Australia, presented by Colonel Carington; two Boat-bills (*Cancroma cochlearia*) from South America, deposited.

CELESTIAL CHEMISTRY*

IT now and then happens in the history of the human race upon this planet, that one particular generation witnesses the most stupendous advancement of knowledge, this advancement generally coming from what one might consider an exceeding small germ of thought. You will at once call to mind several such instances. You will recollect how once a Dutchman experimenting with two spectacle-glasses produced the Telescope; and how the field of the known and the knowable has been enlarged by the invention of that wonderful instrument. Again, you recollect how once Sir Isaac Newton was in a garden and saw an apple fall, and how the germ of thought which was started in his mind by that simple incident fructified into the theory of universal gravitation. You will also acknowledge that each step of this kind has more firmly knit the universe together, has welded it into a more and more perfect whole, and has enhanced the marvellous beauty of its structure.

I think that future times will say that either this generation, or perhaps the next, is as favoured a one as that which saw the invention of the telescope or the immortal discovery of Newton: for as by the invention of the telescope the universe was almost infinitely extended; as from Newton's discovery we learned that like forces were acting in like manner everywhere; so in our time does the wonderful instrument called the Spectroscope show us that like matter is acting in like manner everywhere; so that if matter and force be not identical, then these two, namely, matter and force, may be termed the foundation stones of the universe in which we dwell.

My present object is to bring before you as well as I can some first notions which are to be got out of this general examination of all matter beyond our own planet, in its chemical relations; this examination having been rendered possible by the spectroscope.

In the first instance, before I attempt to deal with chemical ideas in relation to the heavenly bodies, I have two things to do. I must first refer to our earthly notions of chemistry, not of course in their generality, for that would be impossible in the time at my disposal, but to that side of them which touches most intimately what I shall have to say by and by; and I must also refer to the results which we have already obtained with regard to the constitution, so to speak, of terrestrial matter, as it is brought before us by the spectroscope.

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* Revised from short-hand notes of a Lecture delivered at the Quebec Institute, on Tuesday, December 16, 1873.

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